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THE JOURNAL OF PHILOSOPHY

A BEHAVIORIST ACCOUNT OF CONSCIOUSNESS. II

ITS QUALITATIVE ASPECT

I

IN the preceding paper[1] an attempt was made to indicate that consciousness, as constituted of knowings concomitant with other activities or processes, consists of reactions to stimuli and hence consists of behavior. But there still remains to be explained the fact that not only the things known, but also these knowings, are differentiable from each other, in terms that apparently are not themselves behavior; that they are "qualitatively" more or less alike and more or less different; that our judgments of likeness and difference proceed from likeness or difference of "quality." Thence it is traditionally supposed that the real knowing content, whether of the primary or of the concomitant knowings, is "qualitative." And this, by the spiritualist or idealist, is set over emphatically against the "quantitative" as being isolable in experience from it, and even the more real.

The previous paper may be said to deal with the quantitative aspect of our knowings—but not quantitatively and mathematically, and this one with the qualitative aspect. Thus—aside from the generative motive of the following problems—it deals with the chief class of facts that have gone into the making and maintenance of the mind-body problem, the material-immaterial (or matter-spirit) problem, the quantitative-qualitative problem; so many differently formulated statements of the most persistent of apparently metaphysical problems, which is primarily a problem of social control, the historical problem of ebbing authoritarianism seeking to hold its own against the rising tide of universal humanism and democracy. This historical problem, I suggest, has been in actuality a factitious one, generated by authoritarianism in its forced retreat before socially shared fact, as it sought ever to build up new fences about its scientifically and logically threatened prerogatives. On the other hand, I am not unaware of the suggestive value that the pressure of the resultant metaphysical criticism has been to science itself. The hypothesis that I am presenting for the explanation of psychological quality may perhaps be likewise dubbed by the authoritarian as a factitious, rationalizing defense of materialism. I think it well that both the

[1] Vol. XXVI, No. 2.

eristic and the heuristic values of the hypothesis be suggested thus early in the argument, as a stimulus to a more thorough consideration of the evidence on both sides.

The more immediate significance of the hypothesis, however, relates to the psychological problem of the nature of sensation—which includes feeling and emotion as "conscious quality," and to the epistemological doctrine known as Critical Realism. For the scholars of this school, knowledge content is a matter of this conscious quality, or qualitative consciousness, rather than of learned patterns of response to correlatively patterned stimuli; and the content of consciousness, and hence of "knowledge," is variously characterized by these scholars as "data," "character complexes," and "essences." The doctrine seems to be a logical descendant of the Berkeleyan doctrine that our physical objects are really clusters of sensations. The Critical Realist apparently qualifies this doctrine by holding that physical objects *as known to us* are really but sensation complexes, data, essences, or character complexes. Else why, at any rate, should he designate as "essences"—beings or entities—the terms in which, as he holds, they are known? Unless we can refer to objective and socially sharable facts the terms in which we thus try to define knowledge—whether as "sensations," "essences," or what not, we are bound to hide behind some such absolutistic, unintellectualized "alibi" as "ultimateness" or "uniqueness." To attempt to wage a philosophical campaign of enlightenment from such a postulated morass would seem to be a most unintelligent thing to do. After some years of mulling over just this problem, I seem to myself to be prepared to assert as great an objectivity for conscious quality as for the most specifically quantified fact or event. I in no way insist upon the truth of my proposal. I merely present it as an hypothesis, for perhaps better qualified students of the subject to deal with as they will.

II

First, let me exhibit some of the difficulties out of a consideration of which my problem has arisen. If we ask whether these data, character complexes, essences, sensation clusters, qualities, or qualia are physical or otherwise efficacious entities that can serve as stimuli to our receptors or to other organic structures, the answer will quite certainly be negative. But it is held here that every specifiable item of knowledge or other experience is a matter of stimulus and response, even if we consider the stimulus as a trip affording release to a structure in a condition of tonus, rather than as the initial factor in a behavior process. The former alternative describes my own view of the matter. It is held that an act of knowing, whether primary or concomitant, is a reaction to a stimulus, and that a supposed

entity that can not serve as a stimulus to some receptor structure can not even afford an occasion for a designative response, much less for a description or a definition.

Hence two related problems arise. First, how can we describe, define, or even designate entities which of themselves, neither immediately or mediately, can serve as stimuli to evoke any sort of response? Second, how can we presume to employ a supposed knowledge of any such spookish entity as a basis and content either of knowledge itself or of a theory of knowledge? The obvious answer to each question seems to be that it can't be done.

To specify is to make a differentiating response of designation. If we deny physical efficacy to these qualia, in any sense in which they have been traditionally taken, then we are left with a mind-body problem; and thence with the problem of continuity between two apparently different kinds of entity, physical and "metaphysical." It may be suggested by some that these qualia do not "occur" in receptors, but in the cortex, say at local and differently patterned groupings of cortical synapses. But I am here supposing that the function of the cortical neurones, like that of all others, is that of affording a means of differential connection between receptors and effectors, both located outside the brain. Even if we supposed that these qualia occurred at, or were functions of, the cortical synapses, still, in order that we should be able to designate them, they would have to be capable of serving as stimuli to adjacent neurones, so that designative responses could be made to them. But, again, I do not see how we can consider them as being cortical in occurrence—save possibly in cases of changed blood pressure or changed blood content, attributable, say, to endocrine imbalance.

The only possible way of supposing that these qualia can be efficacious as stimuli to evoke even designative responses is to assume some sort of "spiritual" entity or "soul substance," upon which they play or within which they are functions, and which responds to them correlatively with our responses to physical stimuli. But then we have upon our hands the task of explaining what sort of continuity holds between the physical body and this soul substance, whereby this can act upon the cortex or any other part of the organism, to effect the plainly physical acts that designating and describing them are. We have no way of knowing or conceiving how the correlation between activities of the bodily structures and the postulated soul is maintained and synchronized, nor does the parallelist undertake to instruct us here. In fact, this theory is, genetically, but another authoritarian "alibi," which, again, beclouds, rather than illumines the issue. It must be taken on "faith," as an unintellectualized postulate.

If we accept the principle of continuity and have due regard for it as a control over our thinking, we shall have to dismiss the notion of sensations or qualia as being either causes or effects of our "mental" processes, whether we regard them as occurring either in the receptors or in the cortex. On the other hand, if we accept this principle in a designable, physical sense of the word, then how are we to deal with qualia in any designable sense? How do we know these qualia? We do not appear to know of two concomitant or parallel facts, stimulus-pattern and quality. In the case of either spatially or temporally traceable pattern, we *seem* to know the pattern, so that we can designate it, but to know it in qualitative terms that are neither spatial nor temporal.

The reasons for allocating qualia to the cortex have been two in number. First, we have discovered the surpassing complexity of the cortex, and something about its mediating function in behaving. Second, we had the qualia of experience on our hands, and could think of no other locus for their occurrence. We correlated two unknowns and supposed that we had a known—in spite of the fact that sense qualia *do not seem* to occur in the brain, but in the receptors.

Moreover, the old theological tradition, refined as metaphysics, rode like an incubus upon the rising science of psychology. To change the figure, it—unwittingly, of course—turned an intellectual blind spot upon the trail by which the meaning of the facts could be traced. On the one hand, it prevented our discovering that the cortex was only the most complex portion of an inconceivably complex mechanism of differential connection or gear-shift between receptors and effectors, both located outside the brain. On the other hand, it still afforded ground for the authoritarian spiritualist to stand upon, as the non-quantitative and non-quantifiable qualia continued to resist space-time-numerable treatment. Hence the impasse that more than any other thing is still holding up the advance of a really naturalistic psychology.

Now all this is not to say that our sensory data are not real. Our reds and hots and sweets and musical tones are as real as are the stimuli and bodily structures by cooperation of which they are effected. "Red" light waves are not themselves red. The infrared pulsations to which temperature receptors are attuned are not themselves warm or cool. "Sweet" molecular vibrations are not themselves sweet. The physicist's Middle C is not the æsthete's Middle C. A psychological theory that will take due account of these dual aspects of experience will not regard an explaining away of them as an explanation of them. On the other hand, any explanation of them is a reaction, and a reaction is not a duplication of the thing

explained; a response is not a reproduction of its stimulus. We must not expect an explanation of red to be red, or of sweet to be sweet, any more than that an explanation of a fortune or a disease must be a duplication of that fortune or disease. In each of these cases, as in any other, an explanation is a description of the conditions under which these same kinds of facts as effects came to be, and under which they can be produced and duplicated.

IV

But, again having regard for our principle of continuity, how can our reds and sweets as sensations or qualia be regarded as effects, and thence, indeed, also as causes? To prepare the reader for the kind of explanation that is to be hazarded, I suggest that we think a moment of two different kinds of thing.

First, let us have recourse to the etymology of our word "quality," and to considerations of man's uncritical, unreflective use of language. Our English word "quality" is an equivalent of the Latin "*qualitas,*" of which it is but a slightly modified form. This, in turn, is a derivative from the Latin interrogative and relative pronoun and adjective *qualis,* "what kind of"—or, better, "of what kind." It is to be noted also that our English noun "kind," whence "kindness" is derived, is clearly related in origin and meaning to our word "kin." Primarily, "kindness" denotes the types of relationship and behavior that are appropriate among kin; kindness is an exhibition of kin-ness or kinship. The differentiation and grouping of objects and events into kinds is effected upon a basis of detected similarities and differences. This is mathematically describable as a resolution of characteristics of things into statistical homologies representable each by a normal curve. Qualitative differentiation, differentiation of things into kinds, must precede any significant quantitative treatment of them.

Let us consider a moment the significance of this concept of statistical homology. It is generally supposed that all atoms of any given kind or pattern are absolute homologues. It is possible and even probable, however, that the several individual atoms of any given element exhibit but a statistical range of homology, conforming to a normal curve; whence we may infer that the positive and negative electrons of nature—supposing that there are natural entities answering to the physicist's electrons—are also but statistically homologous, kind for kind. So, too, it is altogether possible and not a little probable that the regularities of nature described by scientific or "natural" laws have never attained to a greater absoluteness than would be represented severally by a normal curve. This would be a way of interpreting C. S. Peirce's hypothesis of an evolution of "nat-

ural laws'' out of a precedent chaos.[2] It would also afford a significant interpretation of ''relativity''—each fact of its kind being a representative of its kind, but only relative to its place in a normal curve statistically descriptive of the entire class.

So it is possible and probable that the several characteristics—and their sum total—by which natural objects and events fall into sensibly differentiable and recognizable kinds or classes are in each case a matter of such statistical ranges of homology. So it is of man's height, weight, and other bodily characteristics, and of their several types or patterns of behavior. Now the stimulus forces to which our receptors are severally receptive or responsive are vibrational in character. In frequency, they range continuously from few to some 760 trillions per second, with certain apparent gaps of inefficacy, though it is possible that these are largely fulfilled in cases of our subjective receptors—muscular, tendonous, articular, hunger, thirst, nausea, etc. Yet for all the numerical continuity here exhibited, our experience of these stimuli—our reds and blues, warms and colds, sweets and sours, etc.—seem to be correlated with periods, groups, classes, or kinds of stimulus vibrations. While the series of vibrations that may theoretically serve as stimuli is numerically continuous, yet the levels or kinds of structures from which they come to us are not continuous in kind. Hence it is probable that in the matter of kinds as well as of vigor or intensity, our stimuli fall into statistical ranges conforming to a normal curve. Moreover, our receptive structures also are discontinuous in kind of structure. Numerical position of median and hence of entire range of stimuli received in each case are then presumably determined in part also by the character of the receptive structures. The organization and relatively receptive character of these is perhaps also a matter of statistical ranges, respectively, for the entire human race, and perhaps also for each individual for different periods of his life. This means that the periodic character of our effective stimuli is in part a matter of differences in the characteristic sources and intensities of our stimuli, and in part a matter of receptor responsiveness and adaptation attributable to individual differences of organization or structures.

The literal and really appropriate sense of ''quality,'' then, even as used in psychology, is that of kind, kin, kinship, kin-ness, kind-ness, relative likeness, statistical range of homology of—something. What this something is, we shall consider in a moment. In our psychological and metaphysical use of the word ''quality,'' we have acted as if it were appropriately and synonymously rendered into English by ''kind of,'' and as if we could then react to the ''kind'' of things, their kin-ness or kind-ness, in abstraction from the

[2] ''The Architecture of Theories,'' *Monist*, Vol. I (January, 1891), pp. 161–176, esp. 165.

things themselves. That is, we have tried to abstract and reify or hypostatize this merely statistical kinship of things. As we carry over to concrete nouns the adaptive behavior that we have evolved for the stimulus objects for which they are symbolical or substitutional, so we try to carry over this same type of reaction to our abstract nouns designating relationships among things. We try to find concrete, objective references for them. Hence much of our traditional metaphysics.

That is why psychological quality—sensations, "essences"—has seemed so abstract, elusive, and difficult to describe. Obviously, the kind-ness of things is not an isolable and efficacious entity that can serve as a stimulus to evoke a descriptive or even designative response. It is true that we have these perfectly designable forms of response—"kind," "kind-ness," "likeness," "statistical range," and so on, which themselves can serve as stimuli to evoke other responses. But they are not responses to kind-ness or range itself as stimulus. They are responses to individual facts and thence to natural groupings of objects and events among which, as efficacious terms—termini, terminations, new turns—of behavior, we have been able to state relationships. But relationships as such are not efficacious entities that can serve as stimuli. Our responses designating them are only indirectly evoked, with the objects or terms themselves as stimuli.

Psychological quality, then, is a statistical kind-ness or group-ness, which we have unwittingly tried to abstract from things or events as a sort of self-existent, constitutive entity and tried to describe on its own. Its several forms of appearance are really appearance of the related facts themselves—or verbal substitutes that have been learned for them—as members of already established natural groupings. It is the things, facts, stimuli, or physical events themselves that appear, however, not merely their mere kind-ness.

V

It may now be asked just how we are to think of this matter of quality, and of its correlation with the quantitative aspects of receptor stimulation. In other words, what is the something that appears in statistical ranges of homology as classes or kinds whose several "kind-nesses" constitute our psychological quality? Here is about the last refuge of the distinctively idealistic metaphysics of "mentalism." In particular it is supposed that here at least is an aspect of the mental that physicalism and behaviorism can not give an account of. All the greater challenge to the naturalist, physicist, and behaviorist, then, to make the effort.

The something of which quality is an "aspect," then, I suggest, is a natural fact, not limited to the subjective aspects of organ-

ismic experience. Rather, I suggest that it is an objective as any other natural fact that may occur, whether within or without organic structures. I assume this fact to be, not a persistent, "existent" or constitutive entity, but a natural, physical event or occurrence. Its natural or physical status, then, is not existential or constitutive, but eventual or occurrential. If I suggest that it is of the nature of an impact, clash, or collision, the suggestion may at first be taken to be but an analogy. But, seeing that such events may apparently appear in the organic as well as in the inorganic realm, I propose that my suggested illustrations are actually homologies, though of different sub-classes or sub-kinds within the total range of natural impacts. I suggest that the actual psychological stimulus is not the stimulus agency alone, but a coöperative event—or space-time series of events—in which this agency and the receptor structure participate; it takes two bodies or agencies to effect an impact.

Now the simplest objective kind of impact that will illustrate the case would be that of pairs of like-shaped and equal-weighted bodies of several kinds of structure; say spheres of rubber, steel, ivory, lead, glass, aluminum, etc., etc. We may suppose each of these bodies to represent, as median members, the total statistical class of structure that may properly be designated by the name of its structure or material. And then we may suppose these spheres to be clashed together in paired permutations, rubber upon rubber, glass upon glass, rubber upon glass, etc., etc. Then the quantitative aspect of the impacts will consist in the sum of the velocities in the several cases and the number of impacts per second or other interval. I am suggesting, then, that the impacts will be different *in kind* for the several pairs of bodies involved. I am saying also that if these were natural—not laboratory—events, some certain weight of bodies, sum of velocities, and frequency per standard interval of time would be typical or median, and that statistically describable groups or kinds of impacts would be found. There would be, then, a "family" resemblance among all the impacts of a given statistical range thus naturally established, and any one given impact would be recognizable by its membership within the group. Its kind-ness or quality would thus be that of the entire group, let its locus with reference to the median be what it might, and the quantity or intensity of the impact would also be statistically relative to a median established for the same group.

It is thus that I seem able to describe illustratively, by what I conceive to be a gross homology, the conditions of our several kinds or qualities of sensation. These are not qualities of the objects "sensed," nor of the stimulus agency or medium, nor yet of the receptive structures; they are just the fact of statistically different

groups of the stimulus-receptor events. In case the receptive structure is not modified within the statistical range involved in the kind of event necessary to set up or release a nervous current, there is no "stimulus" and hence, of course, no "response." The psychological stimulus, I suggest, is a coöperative event, an integration of "stimulus" and receptor behavior, such as will initiate or release a nervous current. And the "sensation" or "qualitative experience," I suggest, is just the fact that such events have become naturally differentiated into statistical classes, and that the event "sensed" is a member of one of these classes. This is not to say that the events are red, sweet, or aromatic, but that these are our only cues to differentiation among events so frequent and commingled that we can not distinguish or count them.

Psychological quality, then, is not something that exists or occurs in addition to the stimulation of a receptor structure. It is neither a cause nor an effect of the impact. It is just the fact that the stimulus event—or space-time stream of events—is of a naturally established class or kind. The kind, kind-ness, or quality of the event is no sort of entity that can be abstracted from the physical event of stimulation, or from the class to which the event statistically belongs. Neither is it, therefore, subject to any sort of "spiritualistic" interpretation as being any sort of existential or constitutive thing.

Nor indeed is "quality" peculiar to events occurring within organic structures. The smiting of light or sound waves upon inorganic surfaces generates events just as truly as upon organic surfaces adapted to their integrative reception. What the "quality" of such external events is remains without the range of our experience, if the surface impinged upon by a given stimulus-pattern is structurally different from our receptors that are responsive to it in such ways as to set up a nervous current. It is obviously erroneous, then, to suppose that our visual experience presents us with the "quality" of the objects from which light is reflected to our eyes. It is not to be supposed that the colors of our visual experience are either the actual "colors" of the surfaces of things "out there," or a duplication of them; not any more than that sugar is sweet when it is not being tasted.

Such a disposition of psychological quality should perhaps be welcomed by the physicist, long subjected to criticism by the traditionalist metaphysician, as he has been, on the score that he was blandly indifferent to supposed facts that happened to be dear to authoritarianism and thence to this technical spokesman of it. For not only are the sensations of our special senses to be taken account of in this way, but so also are the so-called "conscious" aspects of feeling and emotion. The more widely pervasive occurrence of stimulus

events throughout the organism in the case of emotion, through sanguinal distribution of endocrine products, in no way serves to discredit the hypothesis here presented—or some other, more tenable line of inquiry that this may possibly suggest.

A further question may now be more specifically raised, of the locus of the occurrences that we differentiate and "appreciate" as quality. I have already suggested that this is the receptor structures in which or through which nervous currents are initiated or released. Because of the traditional association of "mind" with the brain, especially with the cortex, it has been customary to associate our "sense qualities" with the cortex. I have already suggested the obvious function of the cortex. Besides, when some one steps on my corn, or when a mosquito bites my hand, I have no inclination towards rubbing my cortex, but rather my toe or my hand. And so throughout the animal world. It would seem a strangely left-handed and uneconomical piece of work, that the evolutionary process should have located within our skulls a world of events through which, mediately, we and the lower animals must adapt ourselves in our direct commerce with the external world. In all our knowledge of all the mental aberrations thus far exhibited by man, we have no word of any individual who insanely sought within his head for the locus of stimulations occurring in conjunction with the external world. The psychologist, oriented by youthful contact with theology and metaphysics, has come nearer than any really insane man to exhibiting such an error. The principle of parsimony would seem to limit us to a consideration of the receptors as the locus of the occurrence of our consciously qualitative events. We must not let our hypothetical machinery of explanation become more complex than the natural facts that it purports to explain.

But what is the consciousness of these events? As it appears to me, it is the fact of more or less implicitly designating the fact that the stimulus events are taking place. These events are alike or different *in kind,* which literally means *in quality,* in somewhat the ways indicated. The "qualitative consciousness" of them consists simply in the fact that they are of one or another kind, as these kinds or statistical groups have been naturally established. Their quality consists simply in their kinship or kind-ness with others in a naturally developed statistical class or kind.

Many other interesting questions might be asked about various aspects of the problem; for example, about "colored imagery." But space forbids any discussion of them here. The statistician may smile at the crudity of my phraseology, but I trust its meaning is clear. Other objections also may be made, I am sure; and other men might have presented the same theme in a more intelligible form. The case

seems crystal clear to me. I have tried to make it so to others. And so I conclude: The behaviorist must recognize that his stimulus-receptor events fall into natural groups or classes, by reference to which they are differentiated and differentially or adaptively reacted to. The idealistic and metaphysical psychologist must recognize that the kinds of experience that he "appreciates" are but the occurrence of stimulus-receptor events of one or another statistical range of homology. When each does the required thing here, what will be the difference between them, save in the uses to which they put the differentiations made?

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BOOK REVIEWS

Le Progrès de la Conscience dans la Philosophie Occidentale. LÉON BRUNSCHVICG. 2 vols. (Bibliothèque de Philosophie Contemporaine). Paris: Félix Alcan. 1927. xviii + 807 pp.

With the publication of this work Brunschvicg accomplishes a task of extraordinary dimensions. It is a task, moreover, to which the author was led because he conceives that this accomplishment is essential for the progress of philosophy today. Contemporary philosophy, he writes, is "une philosophie de la réflexion, qui trouve sa matière naturelle dans l'histoire de la pensée humaine."[1] He adds that the systems of the nineteenth century were all possessed of the ambition to cover, from origin to terminus, all that the human mind has comprehended and will ever comprehend. They sought to exhaust the possibilities of human experience. Modernity, however, has introduced a new element in the philosophical problem. Since the advent of science philosophy has been, not the total reflection that preceded the differentiation of science and the sciences, but a reflection upon reflection. The task of philosophical thought is now "de prendre conscience du caractère réflexif que présente le progrès de la science moderne."[2] Philosophy is not concerned with the discovery of nature. Its aim is the comprehension of the significance of the alternatives expressed in the movement of intelligence. Science and scientific theories may be regarded from two points of view. On the one hand, science is the life of intelligence, and scientific theories are the specific moments of that life. On the other hand we may inquire what science, and scientific theories as the tentatives of reason, signify for reason itself as the expression of a rational consciousness.

[1] *Le progrès de la conscience*, p. xviii. References to this work hereafter will be indicated by *L. P.*

[2] *L. P.*, p. xviii.

This is the problem of philosophy. An Aristotle may recount the opinions of his predecessors concerning nature as an incident in the statement of his own notions. But in the modern world, when the enterprise of discovery has become subdivided and many subordinate tasks have been distinguished, these results of reflection define for reflection itself an additional problem. The philosopher then studies his predecessors and science, not in order to secure a knowledge of nature, but to explore the meaning of the life of reason. Philosophy requires the interpretation of the history of mind, but not in the sense in which Plato and Aristotle profited by their predecessors or in the sense in which Descartes profited by the Middle Ages. With the *Cogito* there re-emerged the theme of philosophy in its purity. No philosopher, it is tempting to believe, can be both French and not Cartesian. Brunschvicg, who tells us that Condillac's statue was only a bust, must know that there is satire and also pathos in the Cartesian dictum concerning the universality of good sense. He certainly knows that the dictum also means precisely what it states. Because "good sense" is universal, the *Cogito* is fundamental. The problem of modern philosophy was set by Descartes, not in the *Cogito* by itself, but in relation to the fact that good sense is a property of humanity as such. For this reason, philosophical inquiry needs the interpretation of the history of mind as its control. And in this perspective, the history of mind is a *Phænomenologie des Geistes.*

Le progrès de la conscience dans la philosophie occidentale may be regarded as the third member of a trilogy, of which the first and second members are *Les étapes de la philosophie mathématique* and *L'expérience humaine et la causalité physique.* M. Brunschvicg does not, indeed, tell us that the three works were planned as a trilogy. His statement, however, that *Le progrès* follows a method analogous to that employed in the two earlier works suggests this. Moreover, the author admits the unity of spirit in the three works.[3] At any rate, Brunschvicg's Phenomenology of Spirit comprises in fact *L'expérience humaine* if not *Les étapes de la philosophie mathématique.*

It is impossible to read *Le progrès de la conscience*—especially after reading *L'expérience humaine*—without recalling to mind Hegel's *Phænomenologie des Geistes.* Brunschvicg makes a graceful acknowledgment of indebtedness to Hegel. "Sous son aspect d'histoire anonyme sans chronologie mais singulièrement concrète et dramatique, la Phénomenologie de l'Esprit se propose, d'une façon plus spécifique encore et plus expresse que l'avaient fait au XVIII siècle Vico, Voltaire ou Herder, de décrire et d'expliquer le progrès de la conscience humaine: à cet égard la dette de la spéculation contempo-

[3] *L. P.*, p. xviii.

raine envers Hegel demeure immense; et nulle part, moins que dans une étude comme la nôtre, elle ne saurait être contestée ou amoindrie."[4] Brunschvicg's work, especially with respect to concreteness and dramatic quality, worthily follows the high tradition he acknowledges. Between the Phenomenologies of Hegel and of Brunschvicg, however, there are great differences. The work of the latter may lack the majestic sweep of the Hegelian plan. But it never becomes grandiose, and it possesses a clarity of meaning and expression only too frequently lacking in Hegel. Brunschvicg recognizes the continuity—or the continuities—in the history of mind; but it is evident that he fears the seductiveness of the idea of an immanent dialectic. Quoting Royce concerning the unification of logic and history in Hegel's Phenomenology, he adds that because of this unification the Phenomenology remains upon the phenomenological plane. The historical symphony demands a final cadence and that must lie beyond the scope of the Phenomenology. "Le progrès de la conscience ne suffit pas à satisfaire l'éxigence du savoir absolu. C'est sans doute une condition necessaire pour être hegelien que d'avoir le sens des obstacles qu'inévitablement on rencontre, afin de n'y voir en effet qu'une station, afin de suivre le mouvement pour aller plus loin. Mais il faut autre chose encore à Hegel lui-même. Ce qui l'intéresse, ce n'est pas tant l'histoire pour elle-même, que l'au delà de l'histoire, que le dénouement vers lequel elle s'oriente, que la nécessité de ce dénouement. . . le drame lui-même se poursuit à travers le système de l'Encyclopédie, qui comportera une philosophie de la nature et une philosophie de l'esprit."[5] For Brunschvicg, philosophy has a future rather than a conclusion. Plato discovered the task of reason, and Descartes re-discovered it. The future of philosophy is reason's discovery of itself in the discoveries of reason. "La conscience intellectuelle n'a ni signification, ni existence par consequent, hors de l'esprit du savant, qui concentre en lui le contenu du savoir pour faire jaillir de sa reflexion le judgment créateur de la vérité nouvelle, et pour entendre, par la, pour modifier, pour renouveler, l'idée même de la science. . . . De l'ensemble de ces consciences, l'imagination métaphysique travaillerait en vain à composer un système qui aurait pour siège, soit une monade centrale à laquelle on attribuerait l'intuition d'une harmonie universelle, le dessein d'un ordre préalable, soit une 'conscience des consciences,' synthèse des synthèses, qui comprendrait en soi la totalité des pensées dispersées à travers les individus et à travers les génerations. Si un savant de génie exprime à son plus haut degré de tension la conscience intellectuelle de son époque, on ne peut pas dire que la succession des gênies, la chaîne des consciences, doive obéir à une for-

[4] *L. P.*, p. 385.

[5] *Ib.*

mule unique de façon à constituer la loi de série qui engendrerait, selon Leibniz, les variations incessantes de la monade. . . . La contingence du progrès humain est radicale: le centre de la réflexion s'y déplace perpétuellement, entraînant dans ce déplacement, avec la vision que l'intelligence a de l'univers, la perspective de sa propre histoire. . . . Mais de ce que la conscience intellectuelle, inséparable du devenir humain, échappe à toute tentative pour le fixer dans une réalité transcendante à l'esprit, il ne résulte nullement que nous soyons condamné à l'autre branche du prétendu dilemme psycho-théologique ou psycho-sociologique."[6] The life of reason, even if it be not a temporal display of the constitution of the Absolute, is an enterprise with its own worth: it is more than a variety of religious experience or a refinement of anthropology and sociology. The *dénouement* of reason in the *Encyclopedia* is the *dénouement*, not of reason, but of Hegel. To adapt the favorite metaphor of Brunschvicg, the quest of the transcendent Absolute is but a moment in the curve described by the rational consciousness.

The history of thought, and especially the history of modern thought, lays upon scientist and philosopher alike a heavy obligation. Brunschvicg remarks that the connection of mathematical symbols and experimental facts is equally mysterious for the physicist who, through failure to study the evolution of mathematics, imagines that the connection is reducible to a "déroulement machinal de schèmes logiques," and for the mathematician who, through failure to follow the development of physics, "veut que les faits s'y découvrent sous forme d'objets donnés à l'intuition sensible." This indicates that the scientists are under the obligation to become and to remain contemporary with one another, but it indicates just as much the obligation of philosophers to remain contemporary with the scientists. This must be if philosophy be reflection upon reflection. "Si donc une étude partielle de l'histoire a pu conduire certains philosophes, tels que Renouvier à ressusciter et à restaurer des doctrines abolies dépuis l'antiquité, nous croyons que le remède consiste à pousser la connaissance de l'histoire jusqu'à la limite de son rendement maximum. . . . Quiconque, sur le terrain scientifique, croirait devoir faire abstraction de ce qu'il est permis d'apprendre de nos prédecesseurs, parviendrait, sans doute, et en lui supposant du génie à retrouver péniblement des propositions deja connues de tous. Pour ce qui concerne la philosophie, il n'est point téméraire de prédire qu'il retomberait sur les erreurs qui se sont produites au cour des âges et qui ont été, par le progrès de la critique, dénoncées en tant qu'erreurs. Ainsi s'accroitrait encore le danger de régression vers un nouveau moyen âge, dont l'humanité apparait

[6] *L. P.*, pp. 706–707.

ménacée après chaque sécousse de la civilization occidentale."[7] To assist philosophers in becoming contemporaries of their own world by precipitating from the history of ideas its *rendement maximum* requires a phenomenology of mind rather than a history of science or of philosophy. Brunschvicg notes that *Les étapes de la philosophie mathématique* was misapprehended. Because, he says, he sought to attach the great philosophical doctrines to their respective bases furnished by the progress of science, his work was taken as a history of mathematics, an honor he feels impelled to decline. And so with respect to the *L'expérience humaine* he makes a similar disclaimer: here there is nothing which is directly concerned with either the history or the content of the physical sciences. "Notre tâche est, non de savoir comment est faite la nature des choses, mais de dire comment est fait l'esprit de l'homme."[8] Quite a similar remark might be made concerning *Le progrès de la conscience occidentale.*

What, then, is the major theme of this progress? What is the *rendement maximum* of the history of the western consciousness (and conscience)? Brunschvicg's study of the vicissitudes of the occidental consciousness, to use the author's phrase, is provided with its point of departure in the duality within Platonism of philosophical reflection and mythological tradition.[9] Plato marks the culmination, in antiquity, of that high enterprise which the Greeks inaugurated. Philosophy, in its beginnings with the Greeks, is in effect an enterprise of discovery and a practical program. As the former, rational inquiry, guided by reason's progressive consciousness of its own demands and the recognition of its authoritative primacy within human life, represents the chief discontinuity in the history of human mentality. It means, in principle, the recognition of myth as myth, of tradition as tradition. It means, in principle, the acknowledgment that magic is not medical science and astrology not astronomy. It marks the opposition of reason to the claims of oracular utterance, to the authority of ancestral wisdom and ecclesiastical hegemony. With the beginning of philosophy, reason claims supremacy over prophet and seer. On the other hand, as a practical program, philosophy from the first signifies the proposal to confide the guidance of life to the rational consciousness. Conscience shall be the rational consciousness—this is the essence of the practical program. "Nous ne dirons pas de l'homme socratique qu'il a une conscience. . . . L'homme socratique est une conscience. . . ."[10] But Socrates the man—as distinct from the Socratic man—lived within the first crisis produced by the enterprise. With the

[7] *L'expérience humaine, Avant-propos,* pp. xi–xii.
[8] *L'exp. humaine,* pp. xii–xiii.
[9] *L. P.,* p. xiv.
[10] *L. P.,* p. 721.

Greeks, the opposition of philosophy and poetry, left unreconciled by Plato, is the expression of this crisis. From this opposition in its varied re-formulations come the vicissitudes of the occidental consciousness and conscience. This is the reason why, as Brunschvicg states, in the evolution of Pythagoreanism, where the extreme forms of human wisdom and theosophic credulity succeed one another or are juxtaposed, we find the ideal limits of the movement which *Le progrès de la conscience* proposes to study, the ideal limits of a phenomenology of spirit.[11] Plato, ascending to the Idea by way of the dialectic of love, succumbs to the opponent of reason. He is unable to provide the descending movement from the Idea to the psychological consciousness and to things. The history of Platonism discloses two things. ". . . elle permet de préciser le moment de l'opposition radicale entre la vérité de la science et les généralités auxquelles s'arrête la pratique de *l'homo faber*, entre la pureté de la raison et les traditions auxquelles s'asservit l'imagination de *l'homo credulus*. D'autre part, elle explique comment les valeurs de la civilization devaient se dissoudre brusquement sous le coup de l'invasion macédonienne. . . .[12] The moral problem, the recurrent crisis of the western consciousness, is defined by the practical aim of reason—to assure to man "un droit de réprise sur sa propre destinée, le rendre capable d'en devenir l'artisan comme les dieux sont les ouvriers du monde. . . ." [13]

For Brunschvicg a vast period of decadence follows Plato. The Middle Ages—and for Brunschvicg the Middle Ages must begin with Philo—are an extended development of the Platonic failure. Between Plato and Descartes lie two millennia during which the reflective enterprise—and this means philosophy itself—misconceives its problem and perverts its practical program. The *Republic*, "qui devait transmettre à l'occident l'héritage d'une méthode ou s'appuient, sur la fermeté incorruptible de l'intelligence scientifique, la pureté de la spiritualité réligieuse et la pureté de la pratique morale, a pour conclusion paradoxale l'imagination, avouée comme telle, d'une justice cosmique qui suivrait les cadres, qui reflèterait au dehors les exigences, de la justice sociale." [14] Paradoxically, Plato, whose ascending dialectic was a triumphant revelation of reason, becomes responsible for the deflection that persisted for an age. The rationality of the ascending dialectic, says Brunschvicg, did not suffice to veil the "materialistic and illusory character" of the massive mythological basis. Hence Plato comes to rejuvenate the forms of popular credulity, to give to them an appearance of justification that

[11] *L. P.*, p. xvii.
[12] *L. P.*, pp. 37–38.
[13] *L. P.*, p. 6.
[14] *L. P.*, p. 42.

permitted these forms of credulity "to sign a new contract with the centuries."[15] The poets were recalled from exile, and the "continuator of Xenophanes, the disciple of Socrates, was converted into an heir of Homer, a professor of theology and even of mythology."[16] The deification of Alexander was the political symptom of this change, while the culture that triumphed was not Hellenic, but an orientalism masked by Greek philosophy.[17] Between Plato and Philo the center of gravity of spirituality was misplaced, moving from reason to mysticism. For Plato the demiurge is, after all, opinion, not reason. But Alexandria turned the One into a sort of supreme biological or psychological force, and a metaphorical demiurge becomes a metaphysical reality.[18]

Mediæval thought, for one to whom philosophy means what I have sought to indicate, must represent the heteronomy and not the autonomy of reason. There may be exaggeration in describing the Middle Ages as the period in which philosophy served as the handmaid of theology. Historians may have exaggerated the degree of literal subservience of inquiry to dogma, to revelation, to the authority of the Church. But for Brunschvicg this independence is more apparent than real. Even where Authority seems to be left to one side, where thought works in apparent freedom from the constraints of revelation and Ecclesiasticism, the spirit of Authoritarianism persists as a pervading deflecting force. Philosophical inquiry, seemingly independent, ends with Theology precisely because its initial inspiration came from Theology. Here M. Brunschvicg stands in vigorous opposition to those who recently have sought to disinfect the Middle Ages. In the *Expérience humaine* Brunschvicg admits that, in *Les étapes de la philosophie mathématique,* he incurred the reproach of having treated the Middle Ages with a "désinvolture excessive." And, he adds, he may be exposing himself to the same complaint for a second time (i.e., in the *Expérience humaine*). "Mais en vérité," he continues, "il parait bien difficile de traiter comme appartenant a la philosophie, prise dans le sens plein et adéquat de l'idée, une spéculation qui veut être avant tout un compromis . . . un juste milieu entre la spiritualité de la pensée libre et la matérialité d'une révélation literale."[19] He asserts his agreement with Cournot to the effect that the renovating crises of science alone are those that have been really fertile for philosophy. The author's standpoint is not abandoned in the *Progrès de la conscience.* Against Gilson's insistence that Thomism was modern from its birth, that Aquinas was

[15] *L. P.*, p. 43.
[16] *L. P.*, p. 44.
[17] *L. P.*, p. 45; pp. 76–77.
[18] *L. P.*, p. 85 ff.
[19] *Exp. humaine,* p. xiii.

"le premier de philosophes modernes," Brunschvicg must protest vigorously. Socrates and Plato, he states, have taught us the trait by means of which occidental wisdom may recognize a philosophy of reason: this trait is "the solidarity between the autonomy of conscience and the truth of science."[20] And then, adds Brunschvicg, "si philosophie égale raison pure et si la raison pure est, . . . inseparable de la vérité de la science et de la réalité de la conscience, on ne saurait assurement attendre de la scolastique thomiste autre chose qu'apparence de philosophie et qu'illusion de raison."[21] St. Thomas, who reasoned as well as the moderns, suffered from an illusion: "his illusion was only that of believing, and of calling, himself a philosopher when his philosophy is, in reality, a disguised theology."[22]

With the *Cogito* the theme of philosophy—and philosophy itself—re-emerges in perfect clarity. In Plato and Pythagoreanism mathematics was the purest manifestation of that spirituality which alone is unalloyed: the re-discovery and re-formation with Descartes of the task and program of reason is again, and significantly, marked by the rôle of mathematics. One is tempted to add that M. Brunschvicg might have taken as the sign of modernity, not the *Cogito* alone, but that prophetic text of the Rules, to the effect that the infinitude of figures suffices to explain the diversity of things.

The mastery and beauty with which Brunschvicg traces the career of reason from Descartes to Bergson could not be conveyed by a summary. The intricacies of modern thought render difficult even an indication of the problem that Brunschvicg handles. In a sense, the theme is unchanged. The failure expressed by the Platonic substitution of mythology for a descending dialectic of reason is followed even in modernity by a new series of failures. The modern problem turns upon the inability of philosophy to assimilate science. The result is a paradox: science, which should be the embodiment of reason and so the first manifestation of a genuine rational spirituality, is continually set in opposition to that very rational consciousness from which science springs. *La vie intérieure* tends to exclude science while defining the isolated life that remains as spirituality itself. The psychological self and the *Cogito*—how can these be one? Reason in its finest manifestation—in mathematical science—seems alien to consciousness as rational self and as conscience. With Kant the juxtaposition and opposition receive its extreme statement. The world that is science and is for science is generated by reason itself: but the self that should be this reason lies far above consciousness,

[20] *L. P.*, p. 112.
[21] *L. P.*, p. 113.
[22] *L. P.*, p. 114.

while the self that is psychological lies beneath it. In Fichte, in Schelling, and in Hegel we must recognize a new Alexandrian school.

M. Brunschvicg concludes his Phenomenology with a statement of the conditions of spiritual progress. If, with Descartes, philosophy resumes its fundamental theme, it is confronted with a new condition. This condition is science. In science reason views its own first fruits: and the creative movement of philosophy must take account of them. Every effort to establish the spiritual life as an antithesis to science is foredoomed to failure. It constitutes in effect a return to mediævalism and is in fact a denial of philosophy. The spirituality of modern civilization, asserts Brunschvicg, reposes upon the new type, if not of intelligence, at least of thought, that science has set to work. This type of thought, moreover, is not content with the external world alone, and with its exterior, but seeks to take possession of things themselves. Neither life nor consciousness escapes its imperious claims. Philosophy must assimilate this movement rather than rebel against it. ". . . La philosophie du XX^e^ siècle marche à la rencontre de ce qui avait été la base du spiritualisme au XVII^e^ siècle: l'unité de la vérité dans la science et dans la conscience."[23] Brunschvicg, as the *Expérience humaine* makes clear, shares with Whitehead the belief that the philosophical problem has suffered from the confusion of science as such with the science of the seventeenth and eighteenth centuries. Kant proposed that reason should give an account of its own anatomy. But, in fact, in the Critical Philosophy reason does not dissect itself—rather, it dissects and displays the anatomy of eighteenth-century scientific thought. It remains subject to the evil consequences of the classical alternative of ontology or empiricism. For the twentieth century the relation of positive science to conscience and consciousness has been transformed by the transformation of the fundamental idea hitherto defining the connection between mathematics and physics.[24] Relativity has made apparent how truly chimerical is the hope that mind can force the barrier of human experience, and the barrier, once forced, can perceive things in a manner in which we imagine God in his eternity can contemplate them. The barrier, Brunschvicg hastens to make clear, is neither the self of psychology, with its individual data of perception, nor the collective consciousness of the sociologists, "destined to undergo the irresistible pressure of the past, the sovereign authority of opinion"; and finally, it is not the *homo-noumenon* of Kant, "the intemporal vehicle of transcendental concepts." "Pour atteindre l'humanité véritable, qui sera corrélative de l'univers véritable, nous devrons commencer par nous liberer de toute notion préconçue: c'est à cette condition seulement que la science

[23] *L. P.*, pp. 688, 693–694.

[24] *L. P.*, p. 696.

positive pourra nous instruire, avec la même exactitude, et de l'objet qu'elle constitue et du sujet qui la constitue.'' [25]

Vie intérieure and *vie spirituelle*—these, asserts Brunschvicg, must be distinguished and opposed to one another. But modern thought has repeatedly fallen into the fallacy of identifying them. Even with Descartes the *Ego sum* suffers the degradation of identification with *Ego sum Cartesius;* [26] and with this begins the quarrel that Kant vainly sought to adjudicate. Philosophy undertakes to legitimatize the claims of the spiritual life by setting it in opposition to its purest manifestation. And with this the Socratic man is lost. Brunschvicg, as has been noted, tells us that we must say of the Socratic man, not that he *has* a conscience, but that he *is* a conscience. The Phenomenology of Mind, however, as Brunschvicg reveals it, forces upon us a correction of the correction. We should say, not that the Socratic man is a conscience, but that for philosophy and our western culture, the Socratic man is conscience.

And so the *Progrès de la conscience dans la philosophie occidentale* closes with its initial theme. ''Lorsqu'on rêve encore d'une philosophie transcendante à la vérité de la science, d'une religion transcendante à la vérité de la philosophie, il est inévitable que l'on continue à laisser s'interférer le langage de ces deux conceptions; et c'est à ce phénomène d'interférence qu'est dû l'aspect dramatique et tourmenté des vingt-cinq siècles dont nous avons essayé d'esquisser l'évolution intérieure.'' It is for *homo sapiens* to face his destiny. ''Pour faire face aux dangers qui, aujourd'hui autant que jamais, le menacent dans son avenir terrestre, pour ne pas avoir à recommencer son histoire, il faut donc qu'il en médite sérieusement le cours, qu'il sache transporter dans le domaine de la vie morale et de la vie religieuse cette sensibilité au vrai, défiante et délicate, qui s'est développée en lui par le progrès de la science, et qui est le résultat le plus précieux et le plus rare de la civilisation occidentale. La vérité délivre, à la condition seulement qu'elle soit véritable.''

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Zehn Vorlesungen über die Grundlegung der Mengenlehre. A. FRAENKEL. (Wissenschaft und Hypothese Bd. 31.) Leipzig: B. G. Teubner. 1927. Pp. 182.

Since Russell completed his abridged rendering of the *Principia* in prison, no English study has appeared to which the interested reader could turn for a definitive statement of the principles at issue in the recent work on the foundations of mathematics. But much

[25] *L. P.*, pp. 702–703.
[26] *L. P.*, p. 708.

critical water has beaten against the "actual infinite" of Cantor since the first publication of the *Principia,* and in this little book Professor Fraenkel makes a sketch, for readers of German, of the damage wrought, as well as of the important currents which have helped to indent still more the never smooth surface of the theory of aggregates. Himself a distinguished contributor to *Mengenlehre,* Fraenkel presents in almost dramatic form the claims of warring factions in the *Grundlegungstreit,* and while in no sense a philosophical book, it enables the philosophical reader to become familiar easily and briefly with the chief protagonists and their creeds.

There are current at least three different views as to the nature of mathematics. First, and best known to English readers, is the theory of Russell that all of mathematics is deducible from the primitives of logic, that no *special* mathematical intuition is required for establishing any of the propositions in pure mathematics. This theory is not now held in all its purity even by Russell, since the axioms of reducibility, of infinity, and of selectivity are assumed pragmatically as necessary for the development of large existing portions of the science. Secondly, the intuitionist camp of Brouwer and Weyl insists that mathematics depends upon a "pure intuition," particularly of the natural numbers, that logic is derivative from mathematics so conceived, that linguistic formulation is not of the essence of the subject, and hence that the rules of so-called logic, applicable to this *formulation,* can not be carried over significantly to certain portions of mathematics proper. Thirdly, the formalist school of Hilbert, Bernays, and Ackermann takes a less extreme position than Brouwer. For Hilbert, too, mathematics is based upon the intuition of certain extra-logical concrete objects, the *a priori* condition for all thought. But this intuition is not so comprehensive as with Brouwer; it does not embrace the natural numbers, which are to be defined in terms of the more primitive data. Thus this third school, just as the second, has a Kantian slant in the denial of the primacy of general logic for building up the mathematical structure (Cf. Hilbert, *Math. Annalen,* Vol. 95, p. 171). Mathematics and logic receive a joint foundation, and a very explicit formulation (axiomatic) of these intuitions is made to lay the basis for a *Mengenlehre* free from contradictions. The motive of the Hilbert school is indeed to rescue the threatened portions of the doctrine of transfinites from both the paradoxes and the caviling of the radical intuitionists: "Aus dem Paradies dass Cantor uns geschaffen, soll uns niemand vertreiben können" (Ibid. p. 170).

It is the intuitionist school, however, which has contributed most of the disturbance in recent work. Traditionally (although not for the ancients) the criterion of mathematical existence has been free-

dom from contradiction, and in many of the existence theorems of the subject no clue has been given how to *construct* or *evaluate* the entities whose definition is shown to be consistent with the body of mathematics. In the theory of aggregates, for example, it has been shown on the assumption of the multiplicative axiom that every class may be well ordered, that in particular the continuum may be, although no indication has been given *how* it is to be done. Now Brouwer and his followers take as their point of departure a conception of mathematical existence which makes the *production* or *construction* of the defined entities essential to it: existence theorems which prove consistency, but do not indicate how the evaluations are to be made are taken to be *meaningless.* Consequently they are compelled to deny the principle of excluded middle for non-denumerable collections. On their principles, to ask whether the sequence $\pi = 3.14159\ldots$ contains nine successive nines can not be answered by "yes or no," since to say "yes" means for them the production of the sequence required, while to say "no" implies that the existence of such a sequence involves an inconsistency with other known properties of π. The "yes" and "no" in these senses are not contradictories, since one may neither succeed in producing the required sequence, nor show the contradictory character of its supposed existence: statements are to be regarded as significant contradictories only when the subject-matter may be serially surveyed, when it is already constructed. Consequently, too, many (usually regarded as significant) problems become in the eyes of the intuitionists meaningless: it is meaningless according to them to ask whether there are more than five prime numbers of the form $2^n + 1$, or whether π^π is an algebraic number, or whether Fermat's last theorem is true, since the *tertium non datur* can not be applied to sequences which are undetermined. The crux of the position is (at least for Brouwer, though not for Weyl) that the "actual infinite" of Cantor becomes a "growing" or potential one, intimately tied up with the temporal process: for since all the real numbers are not defined constructively, the continuum is not to be regarded as a collection of completed "points" existing prior to their constructive definition; on the contrary, the continuum is essentially incomplete since *future* mathematical processes *invent* new points. Under this radical surgery, a large part of mathematics—almost everything involving non-denumerable collections, which includes a good deal of the theory of a real variable—goes by the board.

When ranking mathematicians are at odds it is ill-advised for an outsider to join the fray. These few remarks are therefore offered timidly. (1) It is certainly proper to point out the character of mathematical existence when conceived in terms of constructibility

and to develop the subject on that basis. But what is wrong, as long as one does not confuse the two, in proceeding on the more general criterion of consistency? (2) The application of hard and fast distinctions to a subject-matter itself contingent and incomplete is fraught with danger. *If* the continuum is such a subject-matter, then surely the *tertium non datur* can be used only with a risk. For one can ask significant questions and utter significant statements only when *some* knowledge of the subject-matter is already obtained, when the subject-matter is determined in *some respect.* Now it seems the defining properties of the continuum enable us to say and to ask *something* about it, and to seek for other properties, known by definition to exhaust the field of inquiry, in terms of this something. To pretend to no knowledge until one does have it is certainly an excellent heuristic principle. But is it not confusing indeterminate knowledge with an indeterminate subject-matter to deny the principles of logic for a field mapped out by definition?

Professor Fraenkel's sympathies lie clearly with Hilbert on most of the points at issue. As it is, he devotes, of his five chapters, the first to an exposition of Cantor's now classic theory and of the havoc wrought by the discovery of the paradoxes, the second to a sketch of Russell's non-predicative processes and of the radical reformation proposed by Brouwer, while the remaining three are taken up with a careful technical presentation of an axiomatic. Fraenkel follows Zermelo in the main, differing from him principally in substituting a generalized definition of "function" for Zermelo's "significant property" which members of a class may possess. There is an interesting account of the multiplicative axiom, its history and implications for other branches of mathematics. Fraenkel notes, rightly, against those who would dispense with it and its consequences because it apparently must be independently assumed, that there is as little reason for such a procedure as there would be in discarding the consequences of Euclid's fifth postulate merely because it can not be proved (p. 96). He believes it is necessary to introduce non-predicative processes to arrive at non-denumerable infinities (p. 113), but shows that on the axiomatic basis the usual antinomies may be avoided. Thus Russell's paradox is eliminated, since it is proved that every class possesses at least one proper-part which is not an element of the class. He also takes a position opposed to that of Hilbert and with Poincaré in maintaining that the natural numbers can not be defined in terms of the general theory of aggregates without circularity (p. 160). But this conclusion seems the result of the confusion so often pointed out between Number, the number two as instance of Number, and a particular pair as an instance of two. There is a brief mention of the mooted Hilbert demonstration that the axioms of the *Mengenlehre* are

self-consistent; if valid, the proof is one of the crown jewels of Hilbert's work and an indispensable part of his doctrine. But for Hilbert too, as has been mentioned, infinite processes are ultimately justified by means of an intuitively-given finite set of operations.

In a very short compass Professor Fraenkel has given much, but one would wish he had given just a little bit more. The work of Wittgenstein, Ramsay, and Sheffer are mentioned only, while the important influence of Husserl upon much of the discussion is neglected completely.

There is a helpful list of recent publications in an appendix.

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The Correspondence of Spinoza. Translated and Edited with Introduction and Annotations by A. WOLF. New York: Lincoln MacVeagh, the Dial Press. 1928. Pp. 502.

The translation of Spinoza's Correspondence forms part of the project Professor Wolf has set himself of translating and annotating the complete works of Spinoza. His excellent translation of the *Short Treatise* eighteen years ago, and his translation of the *Oldest Biography of Spinoza* last year, were valuable contributions to Spinozana for English readers. The selection of the Correspondence as his next translation was a wise choice. For though parts of the letters were translated by Willis and by Elwes, the whole collection has never before been rendered into English. Moreover, the project is excellently timed: Professor Wolf has had the advantage of the critical edition of Dr. Carl Gebhardt which the Heidelberg Academy completed only two years ago. The translation adopts the order, follows the text (with some minor modifications), and takes over much of the critical apparatus, of the Heidelberg edition.

The complete translation places at the disposition of readers to whom the Latin had been closed materials of considerable philosophic importance. Both Willis and Elwes omitted consistently all details of technical scientific discussions, on the supposition evidently that they were of no philosophic significance and that their science was too antiquated to be of technical significance. Professor Wolf has therefore set in English for the first time the discussion of Boyle's treatises on Nitre, on Fluidity, and on Firmness, discussions of optics, hydrostatics, and mathematics; even the long-winded religious inquietudes of Blyenbergh, which had not been translated in full before, deserve to be read for the light they shed on Spinoza's character and ideas. But particularly the discussion of scientific conceptions is important to the estimation, not only of Spinoza's place in the developments of the new sciences, but also to an understanding of his own doctrine of knowledge. Together with the

Second Part and the fragment of the Third Part of the *Principles of Descartes' Philosophy* (it is incidentally to be hoped that Professor Wolf will turn his attention next to a translation of the *Principles,* since the only English translation is so full of errors that it is the source of confusion more than of clarification), they make clear the function of science and the place of experience in relation to reason and understanding. With their addition to the rest of the correspondence, it is needless to insist on the importance of the letters in the interpretation of the philosophy of Spinoza: apart from their purely biographic information, they help elucidate the philosophy, by answering doubts contemporaries had raised concerning works that continue to puzzle interpreters, by developing more fully notions that are only touched on elsewhere, and by treating of related matters that are dependent on the central doctrine.

The translation is, as Professor Wolf insists it is, more accurate than the preceding translations. For the most part it is an almost literal translation of the Latin, and in letters that were previously translated Professor Wolf seems to have made wise use of his predecessors, departing from their rendering when it was ambiguous, and correcting a number of definite errors. In the letters concerning Boyle's treatises he meets a number of very difficult problems of translating and solves them nicely. The objections that suggest themselves are rather to the rhetoric than to the accuracy. At one extreme paraphrases are sometimes indulged in which miss the flavor of the Latin; at the other extreme some passages are rendered so literally that they end in a welter of pronouns. At one extreme it is to be regretted that *rerum solidarum scientia* must be rendered *solid learning;* at the other, that a letter must begin with a sentence (perfectly clear in the Latin, and not impossible but certainly not clear in the English), "What I said in my letters about the Infinite, that they do not infer the infinity of the parts from the multitude of parts, is clear from the fact that if it were inferred from their multitude, we should not be able to conceive a greater multitude of parts, but their multitude ought to be greater than any given multitude, which is untrue." Or again the word *ansae* (referring to the rings of Saturn) is rendered *projections;* whereas ansa is still an intelligible English word for astronomical discussions, and it would have the advantage of conveying that the projections were in the shape of handles and so make clear the manner of their development into rings. But none of these criticisms detract seriously from the value of the book.

Professor Wolf has supplied an Introduction to comment on the significance of the letters and on the personalities of the correspondents, and Annotations to explain words, passages, and persons as

they occur in the letters. The information which is so conveyed should be of great value to the general reader, for it is not otherwise easily available. But Professor Wolf permits his Annotations and more particularly his Introduction to be colored by opinions and polemics which are out of place at this date and in this volume. It is a little distressing that a serious student of Spinoza should take the trouble to demonstrate that "the philosophy of Christendom" (there is no statement of what that may be) is prejudiced from the start and is engaged chiefly in truly amazing acrobatics; that, moreover, the truth about that philosophy can be gathered best from its less intelligent adherents, since they are more candid. This exposition is undertaken to exalt the originality of Spinoza: he could not have been a Cartesian, for Descartes was such an unoriginal pusillanimous Christian philosopher. The statement that Descartes professed skepticism, then ended a loyal Christian, which tergiversation "made him especially dear to the philosophers of Christendom," may have meaning, but the words elude one, particularly in view of Descartes' correspondence and the history of Cartesianism. In the same vein, moreover, Professor Wolf reads a moral for Christians in the inability of Boyle and Oldenburg (good and able men) to understand Spinoza (a better and abler man); and Leibniz's character does not compare favorably with that of Spinoza: Leibniz was a "Christian crusader" and he "could not be expected to have a lasting sympathy with Spinoza."

But besides this religious fury which Professor Wolf introduces into his interpretation of Spinoza's thought, there are more insidiously present philosophic interpretations which need to be defended more fully. For example, he introduces the interpretation of attributes which he developed before the Aristotelian Society last year. "For Spinoza," he says (p. 62), "Extension or Matter is essentially Physical Energy." Yet he translates the words of Spinoza (p. 365), "I believe I have already shown sufficiently clearly . . . that matter is badly defined by Descartes as Extension, but that it must necessarily be defined by an attribute which expresses eternal and infinite essence." Profesor Wolf seems to confuse *Natura Naturans* with *Natura Naturata;* but from his expressions so far one can not be sure. He performs the same service, of course, for Thought, the other attribute of God: "For Spinoza, however, Thought is essentially what Bosanquet would have called a concrete universal—it is the whole system of ideas. Not Thought, but the separate ideas are obtained by abstraction, by quasi-detachment. Thought, as Spinoza conceived it, is a live system of ideas or concepts. If you take away the concepts, you remove, so to say, the members of the organism, and then, of course, there is no organism left" (p. 392).

This regrettable introduction of partisanship and modernization does not detract from the value of the work as a whole. English readers who would understand the philosophy of Spinoza must be very much indebted to Professor Wolf.

RICHARD MCKEON.

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Ratke, Heinrich. Systematisches Handlexikon zu Kants Kritik der Reinen Vernunft. (Der Philosophischen Bibliothek, Band 37 b) Leipzig: Felix Meiner. 1929. vi + 329 pp. 8 M.

Sauvage-Jousse, Paul: Le Métaverbe. Paris: Félix Alcan. 1928. 222 pp. 20 frcs.

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Wieman, Henry Nelson: Methods of Private Religious Living. New York: Macmillan Co. 1929. 219 pp. $1.75 .

Wittenberg Symposium: Feelings and Emotions. By Twenty-four Psychologists: edited by Martin L. Reymert. (The International University Series in Psychology, edited by Carl Murchison) Worcester: Clark University Press. 1928. xvi + 454 pp. $6.00.

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